

# phd<sup>®</sup> REPAIR PROCEDURES: SERIES BST2 TRANSFER ARM

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## PERIODIC LUBRICATION

The Series BST Transfer Arm bearing systems are factory lubricated and designed to use lubrication per FDA Regulation 21CFR 178.3570 and may not need further lubrication for the life of the unit depending on the duty cycle of the machine. However, lubrication of the bearing system every six months is recommended. (See page 3 for rail and carriage lubrication instructions). Also the application of anti-seize to the Weldment Base Assembly (-AP option only) every 4-6 months will provide extended life and keep adjustment components working properly. (See page 6 for anti-seize lubrication instructions).

## HEAD REPLACEMENT

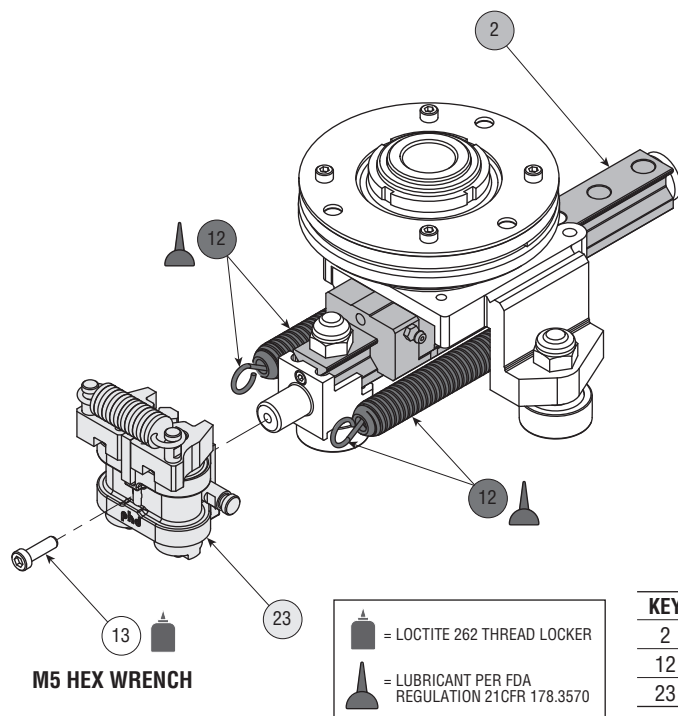
1. Remove return extension springs (12) from head assembly (23).
2. Using an M5 hex wrench, remove screw (13) from rail & carriage assembly (2).
3. Remove gripper head (23) from rail & carriage assembly (2).
4. Place new gripper head assembly (23) onto rail & carriage assembly (2).
5. Apply thread locker and torque screw (13) to 140 in-lb [15.8 Nm].
6. Apply small amount of lubricant on return spring hooks and re-attach springs (12).

## NOTES:

1. Use Loctite 262 thread locker on all threaded fasteners.
2. Use lubrication per NIGL #2 food grade grease per FDA Regulation 21CFR 178.3570 on all metal to metal contact points.
3. Use lubrication per NIGL #0 food grade grease per FDA Regulation 21CFR 178.3570 for rail and carriage maintenance.
4. Use food grade anti-seize per NSF H1 (incidental contact).
5. Standard BST2 Transfer Arms are not designed for Sidel SBO4-SBO8 or SBO28 machines. See "Replacement Reference Chart" on page 4 of main catalog or contact PHD for specific machines.

## TOOLS NEEDED:

- Hex wrenches: M3, M4, M5, and M6
- 80-250 in-lb torque wrench with M3, M4, M5, and M6 hex attachments
- 1/4", 8 mm, 19 mm, 13 mm, 24 mm and 1-1/4" or 32 mm open end wrench (adjustable wrenches can be used in place of open end wrenches)
- Ø58 mm - Ø65 mm Spanner wrench
- Spring puller and arbor press



## TOTAL TORQUE SPECIFICATION CHART

ASSEMBLY ITEM NO.	PART DESCRIPTION	TORQUE	
		in-lb	Nm
3	Carriage to Base SHCS	140	15.8
5	Extend Stop FSHCS	90	10.2
6	Base Spring Holder Pin	140	15.8
7	Lower Cam Bearing Shaft	300	33.9
8	Stud Track Roller (BST2X2-5) Bearing	300	33.9
13	Head to Arm LHCS	140	15.8
15	Bearing Mount	300	33.9
16	Mount Arm to Rail SHCS	90	10.2
21	Upper Mnt Ring to Mid Mnt Ring SHCS	140	15.8
22	Spanner Locking Nut	350	39.5
23	23D Body to Tang SHCS	90	10.2
	23F Body Spring Holder Pin	140	15.8
	23L Jaw Spring Holder Pin	140	15.8
	23M Jaw to Nut SHCS	90	10.2
30	Metric Nut	250	28.2
35	Rear Spring Pin SHCS	90	10.2

KEY	DESCRIPTION	KIT NUMBER
2	Rail & Carriage Assembly	Sold as part of Rail & Carriage Repair Kit
12	Extension Spring	Sold as part of Extension Spring Kit
23	Head Assembly	Full unit description required followed by -H11x

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# phd 90° HEAD REPAIR: SERIES BST2 TRANSFER ARM

## DISASSEMBLY

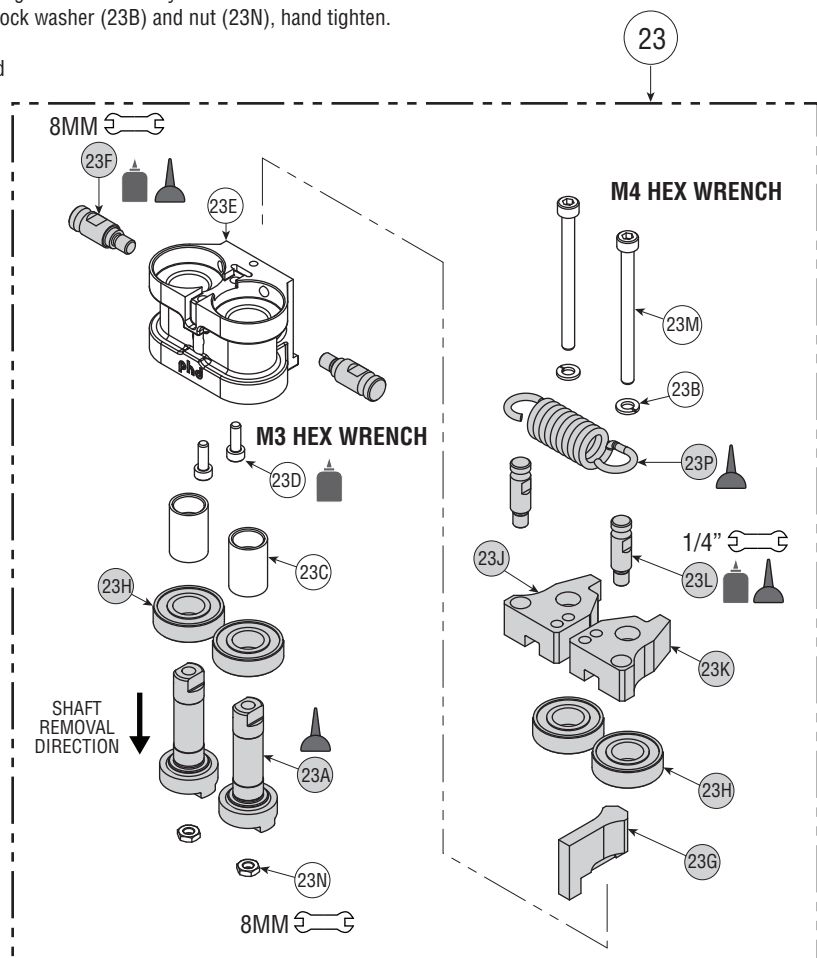
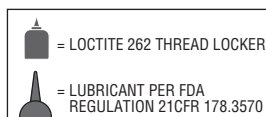
1. Remove head assembly from transfer arm.
2. Remove jaw extension springs (23P) and discard.
3. Remove body spring holder pins (23F) from body (23E) using an 8mm open end wrench.
4. Remove jaw spring holder pins (23L) using a 1/4" open end wrench.
5. Remove nuts (23N) from jaw screws (23M) and lock washers (23B) and remove.
6. Remove left jaw (23J) and right jaw (23K).
7. Remove SHCS (23D) using an M3 hex wrench.
8. Remove tang (23G) from body (23E).
9. Using arbor press, remove the jaw shaft (23A) from bearing (23H) in direction shown.  
**CAUTION:** Use a pin smaller than  $\varnothing.470$  to press the shaft completely out of both bearings (23H) on each side.
10. Using arbor press and pin of .468 diameter, press bearing (23H) from body (23E).

## ASSEMBLY

11. If replacing body spring holder pins (23F), place thread locker adhesive on thread and screw into body (23E), using an 8 mm open end wrench torque to 140 in-lbs [15.8 Nm]. Repeat process for other return spring pin (23F).
12. If replacing jaw spring holder pins (23L), place thread locker adhesive on thread and screw into left jaw (23J), using a 1/4" open end wrench torque to 140 in-lbs [15.8 Nm]. Repeat process for other return spring pin (23L).
13. Using arbor press, install jaw bearing (23H) into body (23E), seat bearings to bottom of counterbore.
14. Slip bearing spacer (23C) into body (23E) from opposite side.
15. Using arbor press, install jaw bearing (23H) into other end of body (23E), seat bearings to bottom of counterbore.
16. Install tang (23G) into slot in top of body (23E)
17. Secure tang (23G) to body (23E) using SHCS (23D), apply thread locker onto thread, using an M3 hex wrench torque to 90 in-lbs [10.2 Nm].
18. Using arbor press, install the shaft (23A) through both bearings (23H).
19. Fit the left jaw (23J) onto the top of the shaft (23A) aligning with the shaft key.
20. Secure left jaw (23J) to shaft (23A) using SHCS (23M), lock washer (23B) and nut (23N), hand tighten.  
**NOTE:** If attaching finger tooling to end of shafts (23A), discard nut (23N), apply thread locker onto thread and torque to 90 in-lbs [10.2 Nm].
21. Repeat steps 19 & 21 for right jaw (23K).
22. Lubricate jaw extension spring hooks (23P) and place on spring pins (23L).

TOTAL TORQUE SPECIFICATION CHART				
ASSEMBLY ITEM NO.	PART DESCRIPTION	TORQUE		
		in-lb	Nm	
23	23D	Body to Tang SHCS	90	10.2
	23F	Body Spring Holder Pin	140	15.8
	23L	Jaw Spring Holder Pin	140	15.8
	23M	Jaw to Nut SHCS	90	10.2

Highlighted parts included in:  
Heatset Head Repair Kit 84318-01  
Coldset Head Repair Kit 84318-02



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# phd<sup>®</sup> LINEAR CAM BEARING & RAIL & CARRIAGE ASSEMBLY: SERIES BST2 TRANSFER ARM

## DISASSEMBLY

- Using an M5 hex wrench, remove SHCS (3) and serrated washers (31) from rail & carriage assembly (2) and base assembly (1).
- Using an M3 hex wrench, remove FHCS (5) from extend stop (4).
- For linear cam bearing removal:
  - Using a 19 mm wrench, remove cam bearing shaft (15) from mount arm (14) and rail and carriage assembly (2).
  - Remove metric shim washers (10) from cam bearing shaft (15).
  - Remove cam bearing (8) from cam bearing shaft (15)

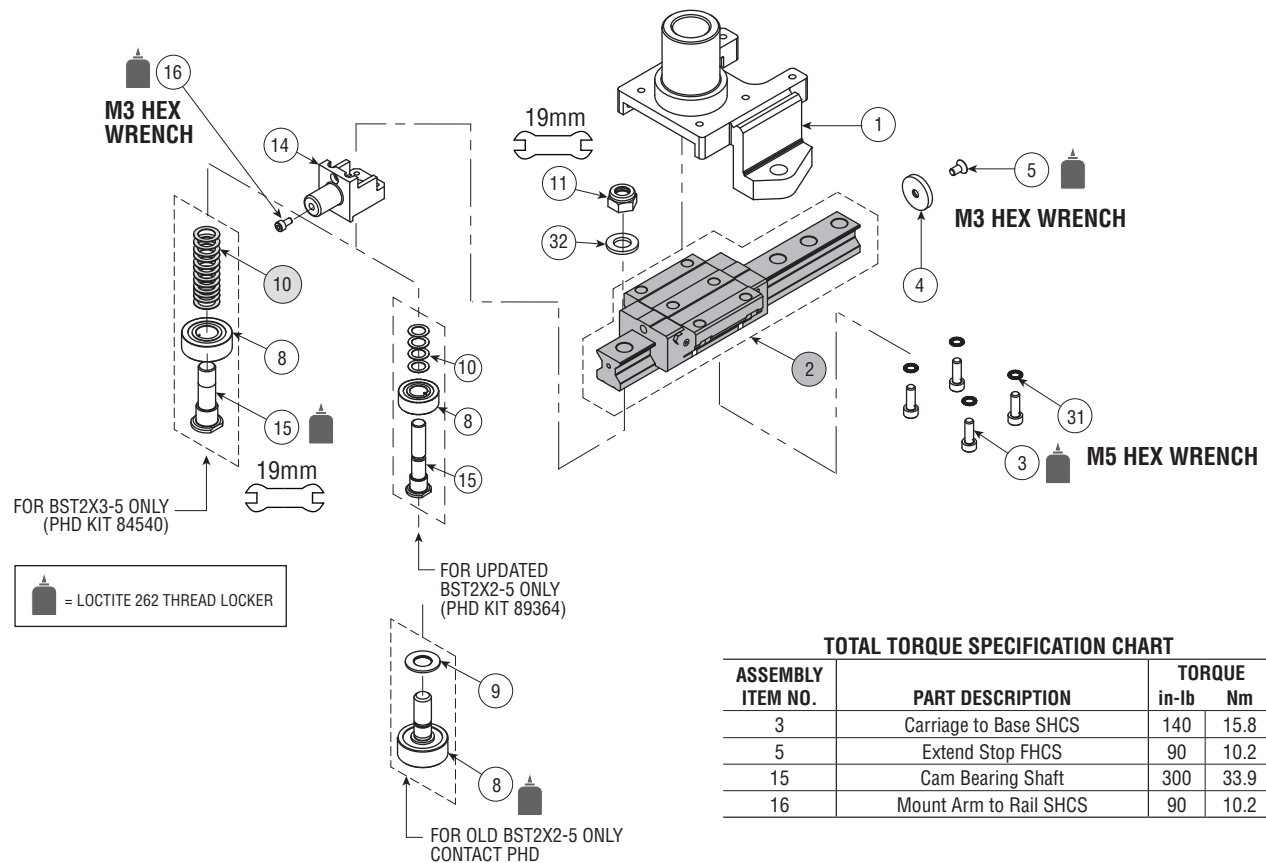
## ASSEMBLY

- Attach extend stop (4) to rail & carriage assembly (2) using FHCS (5). Apply thread locker to threads, torque screws to 90 in-lbs [10.2 Nm] using M3 hex wrench.
- Attach rail & carriage assembly (2) to base assembly (1) using SHCS (3). Apply thread locker to threads and torque screws to 140 in-lbs [15.8 Nm] using M5 hex wrench. Make sure that the carriage is seated flat in the pocket of the base assembly.
- Slip mount rail (14) onto rail & carriage assembly (2) until seated on end and bottom of rail, secure with SHCS (16). Apply adhesive to threads and torque screw to 90 [10.2 Nm] using an M3 hex wrench.
- For linear cam bearing attachment:
  - Attach cam bearing (8) onto cam bearing shaft (15).
  - Install metric shim washers (9) onto cam bearing shaft (15).
  - Apply thread locker to cam bearing shaft (15) threads and insert through mount rail (14) and thread into rail and carriage assembly (2).
  - Install washer (32) and nylon insert locking nut (11) onto cam bearing shaft (15). Torque to 300 in-lbs [33.9 Nm]. Using a 19 mm wrench in cam bearing shaft (15) and nylon insert locking nut (11).

## NOTES:

- PHD recommends lubricating the rail & carriage assembly (2) with NLGI #0 food grade grease per FDA Regulation 21CFR 178.3570 using the grease zerk in the side of the carriage block. Use no more than 3 grams (3 CC or .1 ounce) of grease while moving the arm in a back and forth motion to distribute the lube. Bearing end caps can be damaged if over pressurized by the lubrication.

**WARNING!** DO NOT OVERFILL or PACK the carriage with grease, this could cause damage to the carriage.



**TOTAL TORQUE SPECIFICATION CHART**

ASSEMBLY ITEM NO.	PART DESCRIPTION	TORQUE	
		in-lb	Nm
3	Carriage to Base SHCS	140	15.8
5	Extend Stop FHCS	90	10.2
15	Cam Bearing Shaft	300	33.9
16	Mount Arm to Rail SHCS	90	10.2

KEY	DESCRIPTION	KIT NUMBER
2	Rail & Carriage Assembly Repair Kit	84317
10	Cam Bearing Shim Kit	84917

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# phd PIVOT BEARING & SPRING RETENTION: SERIES BST2 TRANSFER ARM

## DISASSEMBLY

8. Using an M4 hex wrench, remove SHCS (35), serrated washers (34) and spring washers (33) from the spring holder pins (6).
9. At this time the springs (12) can be removed.
10. Using a 13 mm open end wrench, remove the spring holder pins (6) from base assembly (1).
11. For BST2x3-5 units:
  - A) Using a 19 mm open end wrench and an M8 hex wrench, remove nylon insert locking nut (11) from the base assembly (1) and cam bearing shaft (7).
  - B) Remove cam bearing shaft (7) from base assembly (1).
  - C) Remove metric shim washers (10), cam bearings (8) and bearing to bearing spacer (9) from cam bearing mount shaft (7).
12. For BST2x2-5 units:
  - A) Using a 19 mm open end wrench and an M6 hex wrench, remove nylon insert locking nut (11) from the base assembly (1) and track roller cam bearing shaft (8).
  - B) Remove bearing spacer (9) from track roller cam bearing shaft (8).

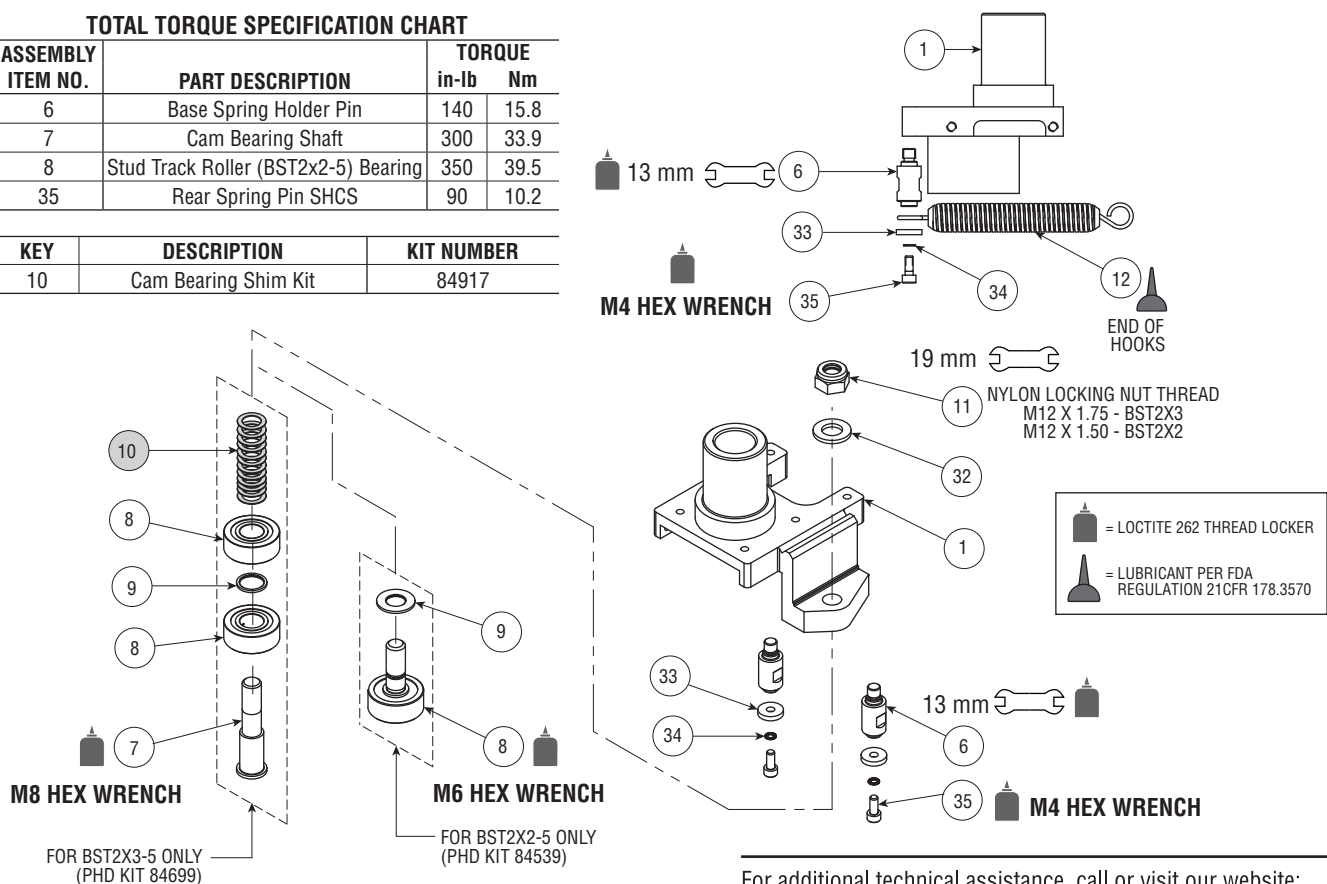
## ASSEMBLY

13. Attach spring holder pins (6) to base weldment assembly (1), apply thread locker to threads, using a 13mm open end wrench, torque to 140 in-lbs [15.8 Nm].
14. Lubricate inside of hooks on extension springs (12).
15. Place the springs (12) onto the spring holder pins (6).
16. Attach the SHCS (35) with the serrated washer (34) and washer (33) to the spring holder pin (6), apply thread locker to threads, using an M4 hex wrench, torque to 90 in-lbs [10.2 Nm].
17. For BST2x3-5 units:
  - A) Attach cam bearing (8) onto cam bearing shaft (7).
  - B) Install metric shim washers (9) onto cam bearing shaft (7).
  - C) Attach next cam bearing (8) onto cam bearing shaft (7).
  - D) Install cam bearing shaft (7) through Base Weldment (1).
  - E) Install washer (32) and nylon insert locking nut (11) onto cam bearing shaft (7). Torque to chart using a 19 mm wrench on cam bearing shaft (7) and nylon insert locking nut (11).
18. For BST2x2-5 units:
  - A) Install bearing spacer (9) over shaft of track roller (8)
  - B) Install track roller cam bearing shaft (8) through Base Weldment (1).
  - C) Install washer (32) and nylon insert locking nut (11) onto track roller bearing shaft (8). Torque to chart using an M6 hex wrench on track roller bearing shaft (8) and a 19mm wrench on the nylon insert locking nut (11).

### TOTAL TORQUE SPECIFICATION CHART

ASSEMBLY ITEM NO.	PART DESCRIPTION	TORQUE	
		in-lb	Nm
6	Base Spring Holder Pin	140	15.8
7	Cam Bearing Shaft	300	33.9
8	Stud Track Roller (BST2x2-5) Bearing	350	39.5
35	Rear Spring Pin SHCS	90	10.2

KEY	DESCRIPTION	KIT NUMBER
10	Cam Bearing Shim Kit	84917



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# phd<sup>®</sup> STD MAIN BEARING: SERIES BST2 TRANSFER ARM

## DISASSEMBLY

19. Using a Ø58 mm - Ø65 mm spanner wrench remove locking nut (22) from base assembly (1).
20. Using an M5 hex wrench, remove upper mount ring SHCSs (21) from upper mount ring (20).
21. If applicable, remove flange base shims (24).
22. Press the base assembly (1) out of the shaft bearing (19) using arbor press.
23. Press shaft bearing (19) from middle bearing mount ring (18).
24. Slide lower mount ring (17) from middle mount ring (18).

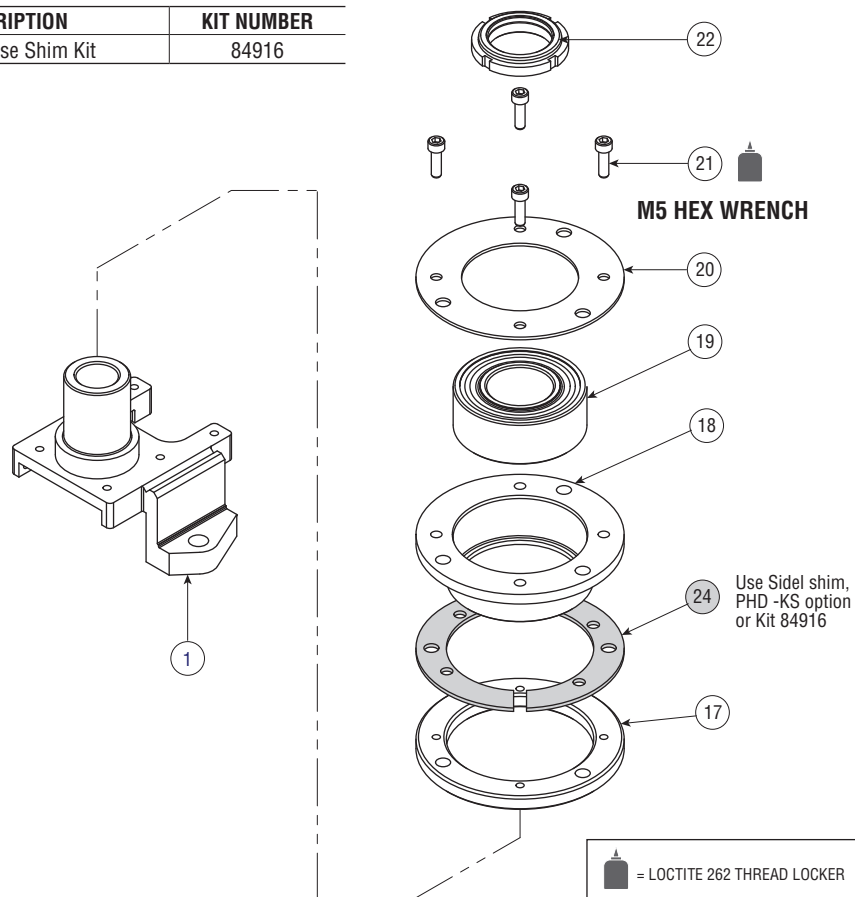
## ASSEMBLY

25. Press shaft bearing (19) into middle mount ring (18) using arbor press.
26. Install upper mount ring SHCS's (21) to upper mount ring (20) through middle mount ring (18) flange base shim (24) and thread into lower mount ring (17), torque to 140 in-lbs [15.8 Nm] using a M5 hex wrench.
27. Press the above assembled parts onto the base assembly (1) until seated using arbor press.
28. Attach spanner locking nut (22) to base assembly (1), torque to 350 in-lbs [39.5 Nm] using a Ø58 mm - Ø65 mm spanner wrench.

### TOTAL TORQUE SPECIFICATION CHART

ASSEMBLY ITEM NO.	PART DESCRIPTION	TORQUE	
		in-lb	Nm
21	Upper Mounting Ring to Mid Mounting Ring SHCS	140	15.8

KEY	DESCRIPTION	KIT NUMBER
24	Flange Base Shim Kit	84916



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# phd<sup>®</sup> -AP BEARING: SERIES BST2 TRANSFER ARM

## DISASSEMBLY

19. Using a 32mm open end wrench, hold the vertical adjustment mount (27) and remove metric nut (30) using a 24mm open end wrench.
20. Once the metric nut (30) is removed, remove the serrated washer (29).
21. Using a  $\varnothing 58$  mm -  $\varnothing 65$  mm spanner wrench, remove locking nut (22) from vertical adjustment mount (27).
22. Using an M5 hex wrench, remove upper mount ring SHCSs (36) from upper mount ring (20).
23. Press the vertical adjustment mount (27) out of the shaft bearing (19) using an arbor press.
24. Press shaft bearing (19) from middle bearing mount ring (26).

## ASSEMBLY

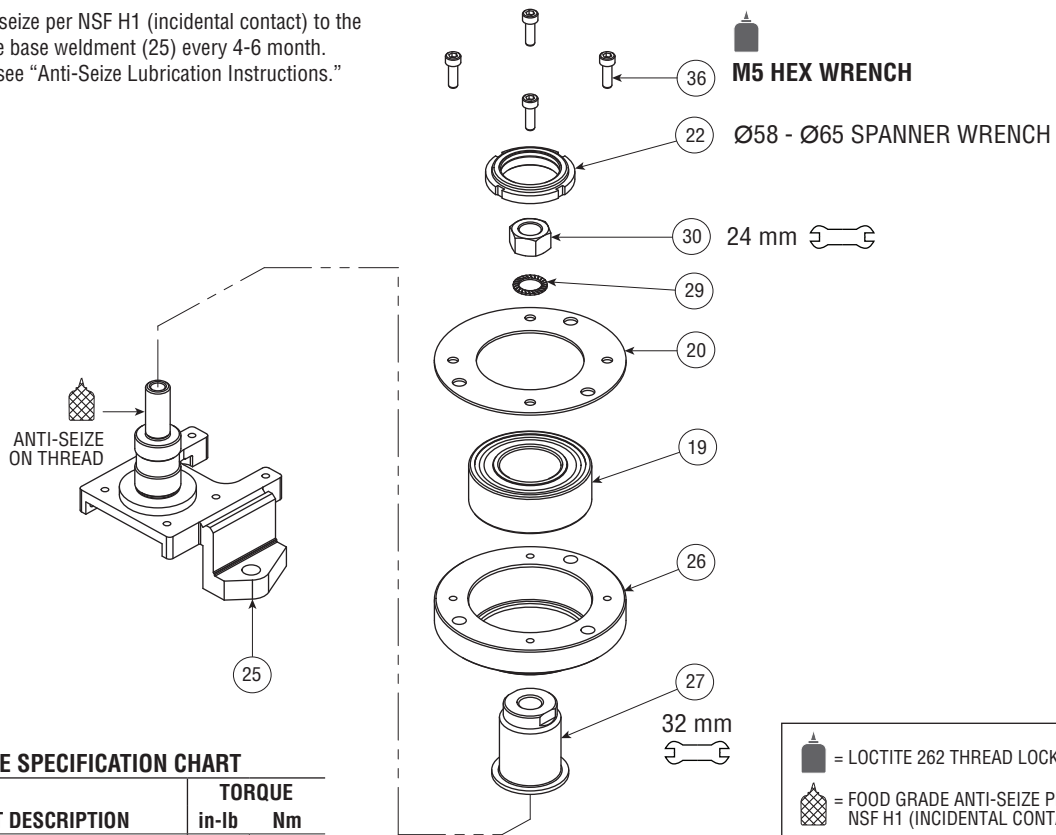
25. Press shaft bearing (19) into middle mount ring (26) using arbor press.
26. Apply thread locker to threads and install upper mount ring SHCS's (36) to upper mount ring (20) and thread into lower mount ring (26), torque to 140 in-lbs [15.8 Nm] using an M5 hex wrench.
27. Press the above assembled parts onto the vertical adjustment mount (27) until seated using arbor press.
28. Lubricate the ID of the vertical adjustment mount (27) and thread onto base assembly (25) until seated.
29. Apply Anti-seize to thread on base assembly (25).
30. Install vertical adjustment mount (27) onto base assembly (25) until seated.
31. Thread locking nut (30) onto vertical adjustment mount (27), torque to 350 in-lbs [39.5 Nm] using a  $\varnothing 58$  -  $\varnothing 65$  spanner wrench.
32. Slip the serrated washer (29) over the threaded portion of the base assembly (25).
33. Thread metric nut (30) onto the threaded portion of the base assembly (25).
34. Once the unit is installed into the machine and adjusted to the proper height, tighten the adjustment by using a 32 mm open end wrench for the vertical adjustment mount (27) and a 24 mm open end wrench for the metric nut (30), then torque to 250 in-lbs [28.2 Nm].

## ANTI-SEIZE LUBRICATION INSTRUCTIONS:

1. Loosen nut (30) and unthread to top of threaded shaft on base weldment (25).
2. Rotate Vertical Adjustment Mount (27) CW (clockwise) to expose the maximum thread.
3. Apply anti-seize and move nut (30) and Vertical Adjustment Mount (27) back and forth to work anti-seize into threaded components.
4. Adjust Vertical Adjustment Mount (27) to desired height and torque metric nut (30).

## NOTES:

1. Apply food grade anti-seize per NSF H1 (incidental contact) to the threaded portion of the base weldment (25) every 4-6 month.  
To re-apply anti-seize see "Anti-Seize Lubrication Instructions."



**TOTAL TORQUE SPECIFICATION CHART**

ASSEMBLY ITEM NO.	PART DESCRIPTION	TORQUE	
		in-lb	Nm
36	Upper Mounting Ring to Mid Mounting Ring SHCS	140	15.8
30	Metric Nut	250	28.2
22	Locking Spanner Nut	350	39.5

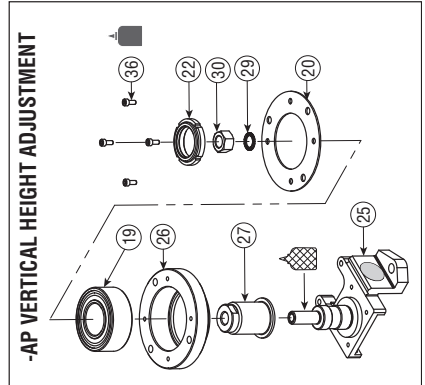
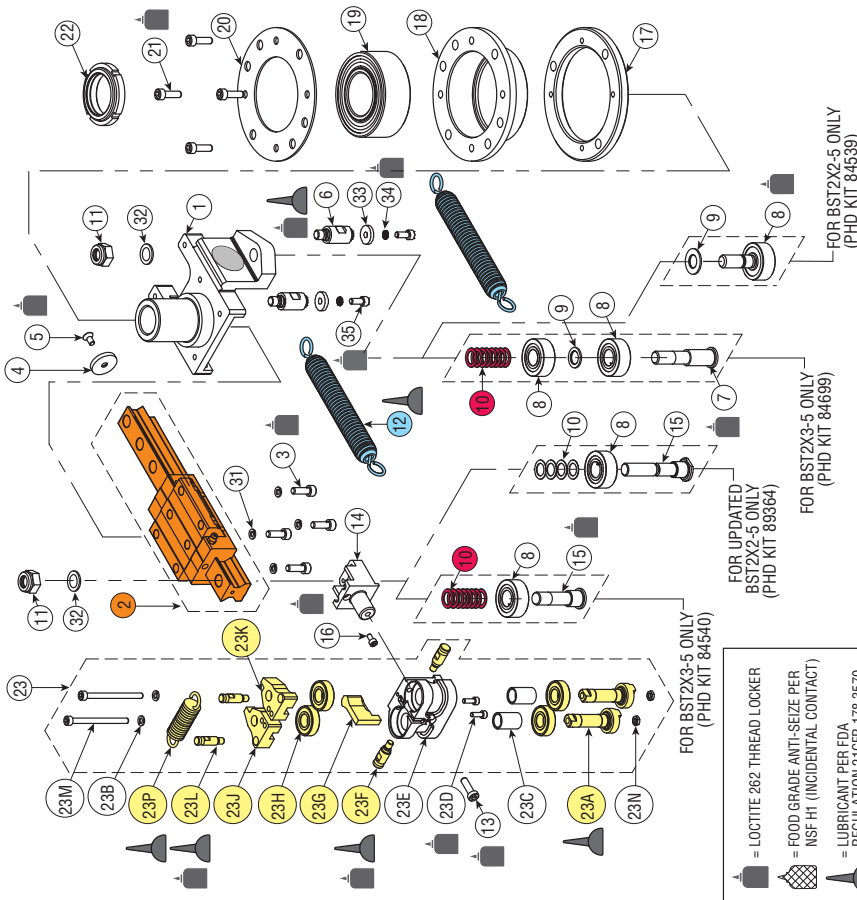
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# EXPLODED VIEW: SERIES BST2 TRANSFER ARM

KEY	PART DESCRIPTION	Part #	
		BST2x3-5	BST2x2-5
1	Weldment Base Assembly	83000	
2	Rail & Carriage Assembly	Sold as Part of Rail Repair Kit	
3	Carriage to Base SHCS	14308-117	
4	Extend Stop	83867	
5	Extend Stop SHCS	14308-584	
6	Spring Holder Body Pin	85291	
7	Pivot Cam Bearing Shaft	82889	
8	Bearing (Linear Cam)	—	84536-01
9	Bearing (Pivot Cam)	85364	83714
10	Bearing to Bearing Spacer	—	
11	Commercial Shim Washer	77430-05-004-0	
12	Nylon Insert Lock Nut (Linear / Pivot Cam)	65759-007	
13	Nylon Insert Lock Nut (Pivot Cam)	—	65759-013
14	Extension Spring	Sold as Part of Extension Spring Kit	
15	Head to Arm SHCS	14308-436	
16	Arm Mount	82858	
17	Bearing Mount	83713	
18	Mounting Arm to Rail SHCS	14308-401	
19	Lower Bearing Ring Mint	82888	
20	Mid Bearing Ring Mint	82884	
21	Bearing	2334-051-01	
22	Upper Bearing Ring Mint	82885	
23	Upper Bearing Ring Mnt SHCS	61054-117	
24	Locking Nut	82887	
25	Total Head Assembly	Full Unit Description followed by -HT1x	
26	Shaft	81388-01 or Sold as Part of Head Assembly	
27	Split Lock Washer	61745-008 or Sold as Part of Head Assembly	
28	Bearing Spacer	81393 or Sold as Part of Head Assembly	
29	Body to Tang SHCS	14308-019 or Sold as Part of Head Assembly	
30	Body	81332 or Sold as Part of Head Assembly	
31	Body Sprint Holder Pin	84683 or Sold as Part of Head Assembly	
32	Tang	81394 or Sold as Part of Head Assembly	
33	Bearing	2334-050-01 or Sold as Part of Head Assembly	
34	Left Jaw	84475 or Sold as Part of Head Assembly	
35	Right Jaw	84476 or Sold as Part of Head Assembly	
36	Jaw Spring Holder Pin	82883 or Sold as Part of Head Assembly	
37	Jaw to Nut SHCS	14308-111 or Sold as Part of Head Assembly	
38	Metric Nut	3204-023 or Sold as Part of Head Assembly	
39	Jaw Extension Spring	Full Unit description followed by -H1600 or Sold as Part of Head Assembly	
40	Weldment Base Assembly	84301	
41	Mid Bearing Ring Mint	83990	
42	Vertical Adjustment Mint	83871	
43	Serrated Washer	84141-017	
44	Metric Nut	3204-083-1	
45	Serrated Washer	84141-008	
46	Flat Metric Washer	64398-11-1-02	
47	Spring Base Washer	85290	
48	Serrated Washer	84141-007	
49	Washer to Spring Post SHCS	61054-099	
50	Upper Bearing Ring Mount SHCS	61054-115	

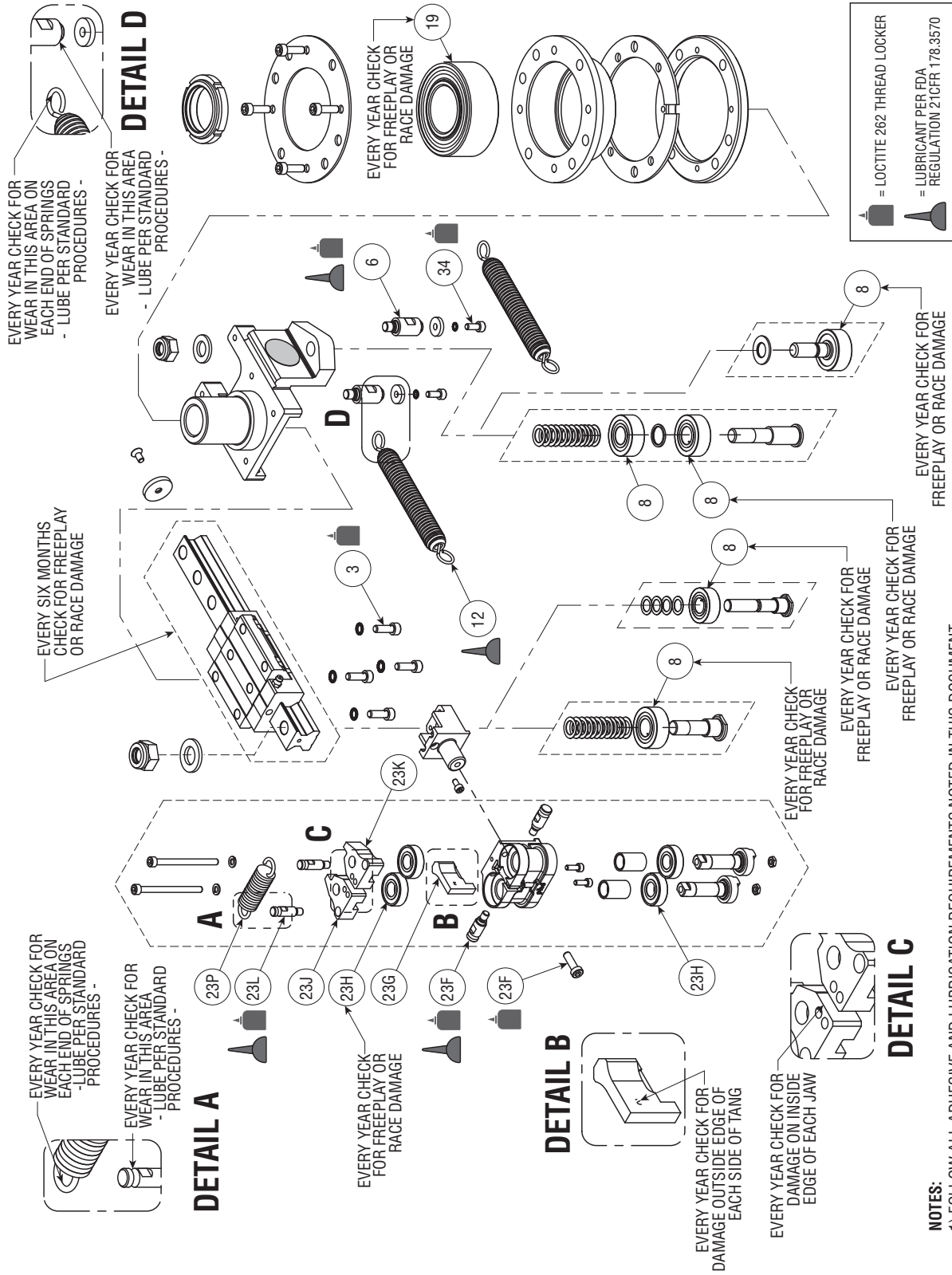


KIT DESCRIPTION	BST2x3-5	BST2x2-5	KIT NO.
Rail & Carriage Assembly Repair Kit	84317	85895	BST2x2-5
Head Repair Kit - Heat Resistant (HR)	84318-01		
Head Repair Kit - Cold Set (CSD)	84318-02		
Spring Extension Spring Kit	84319		
BST2x2 Pivot Cam Bearing Replacement Kit	84539		
BST2x3 Linear Cam Bearing Replacement Kit	89364		
Flange Base Shim Kit	84916		
Cam Bearing Shim Kit	84917		

- KITS**
- LOCITITE 262 THREAD LOCKER
  - FOOD GRADE ANTI-SEIZE PER NSF-H1 (INCIDENTAL CONTACT)
  - LUBRICANT PER FDA REGULATION 21CFR 178.3570

# phd ANNUAL INSPECTION: SERIES BST2 TRANSFER ARM

## SERIES BST2 TRANSFER ARM RECOMMENDED ANNUAL INSPECTION POINTS



- NOTES:**
- 1) FOLLOW ALL ADHESIVE AND LUBRICATION REQUIREMENTS NOTED IN THIS DOCUMENT.
  - 2) FOR PROPER TORQUE REQUIREMENTS SEE REPAIR PROCEDURE DOCUMENT 6441-636.
  - 3) FOR PROPER LUBRICATION SPECIFICATIONS SEE REPAIR DOCUMENT 6441-636.

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